DOCUMENT RESUME

ED 263 205 TM 850 700

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TITLE A Reexamination of the Factor Structure of the Student Evaluation of Teaching across Grade Levels.
PUB DATE 7 Nov 79
NOTE 26p.; Paper presented at the Annual Meeting of the Mid-South Educational Research Association (Little Rock, AR, November 7, 1979).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Age Differences; Beginning Teachers; Elementary Secondary Education; Factor Analysis; *Factor Structure; Rating Scales; *Student Evaluation of Teacher Performance; *Test Reliability; *Test Validity
IDENTIFIERS Pupil Observation Survey Report; *Student Evaluation of Teaching (Test)

ABSTRACT

The Student Evaluation of Teaching instrument (SET) was administered in grades 4 through 12, to examine its construct validity and usefulness for grades 4 to 6. The original SET was developed for grades 7 to 12. This sample included 419 students in grades 4 to 6, and 612 students in grades 7 to 12. Teachers were graduates of Western Kentucky University who had one to five years of experience, and were evaluated as part of the Teacher Preparation Evaluation Program. Analyses concentrated on the factor structure of the SET and its quality in measuring the five constructs suggested by its original developers: friendly and cheerful; knowledgeable and poised; lively and interesting; firm control; and nondirective. These factors were found in the Pupil Observation Survey Report (POSR), from which the SET was derived. Separate factor analyses were conducted for elementary and secondary school samples. Results indicated that the original factor structure for secondary students was generally replicated. However, the structure was weak, questioning the internal consistency of the dimensions. Elementary student data did not replicate the original factor structure. Reliability coefficients were very low. It was recommended that individual items were suitable for use in only the secondary grades. (GDC)

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A Reexamination of the Factor Structure of the Student Evaluation of Teaching Across Grade Levels

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Prepared for:

Mid-South Educational Research Association

Little Rock, Arkansas

November 7, 1979

TM 850 700

The cost of printing this publication by Western Kentucky University was paid from state funds KRS 57.375

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A Reexamination of the Factor Structure of the Student Evaluation of Teaching Across Grade Levels

The systematic evaluation of teachers by their students has been found to provide useful information for a variety of purposes. In a study by Remmers (1963) it was reported that when 25 or more student ratings were averaged, data were obtained that were as reliable as the better educational and mental tests in predicting teacher effectiveness. Thompson (1974) concluded that the evaluation of staff by students should be recognized as providing a unique and vital perspective of faculty performance. Student evaluations should be studied along with assessments from peers and supervisors in an effort to improve the instructional programs of secondary schools.

In teacher education, student evaluations may also serve as important sources of information. Veldman (1970) stated that student teachers could profit greatly from a systematic knowledge of how they are perceived by their students as they develop in their professional roles. He further related that this feedback would probably be most effective in a context where both the student teachers and

their supervisors jointly review the profiles generated by student evaluations. This knowledge will in most cases only confirm what the teacher already knows, while in others, may reveal something about their impact on children which previously was unknown.

A second purpose of student evaluations in teacher education was recognized by Sandefur (1970). He suggested that teacher educators should use student evaluations of their graduates to provide additional information for decision making in teacher education programs. In his model for follow-up evaluation of teacher education graduates, Sandefur (1970) stated, "toward the end of the student teacher period, every pupil of the of the student teacher should complete an unsigned SET [Student Evaluation of Teaching] to be administered by the observer-recorder."

The Student Evaluation of Teaching (SET), referred to by Sandefur, was an instrument developed at the Research and Development Center for Teacher Education, University of Texas at Austin by Veldman and Peck (1961) to measure pupil perceptions of their teacher on five general dimensions. This instrument was developed for the purpose of student feedback to student teachers. For this use, a simple, easily administered and easily scored instrument was desirable.

Veldman and Peck (1963) proceeded from the belief that simple sums of clustered items were more useful than regression weighted scores. In a later study, Veldman supported this arguement for simple measures by citing a 1967 study by Schweiker which concluded that simple measures are easier to compute, are more directly interpretable and are less subject to distortion when equations are applied to data not included in the original analysis (Veldman 1970).

The SET was derived from the Pupil Observation Survey Report (POSR), also a product of the R&D Center, through factor analysis statistical techniques. The POSR was administered to the classes of 554 student teachers in grades seven through twelve who were enrolled in the Teacher Education Program at the University of Texas at Austin. The factor analysis performed by Veldman and Peck disclosed five factors of the 38 item POSR. These five factors were referred to as: 1. Friendly and Cheerful, 2. Knowledgeable and Poised, 3. Lively and Interesting, 4. Firm Control, and 5. Nondirective.

To simplify the factor structure, factors of two and three items most strongly related to the original factors were selected to represent the POSR factors. These two and three factors were correlated to the original POSR items to determine their strength of relationship. Table 1 contains these correlations.

TABLE 1

Development of the SET *

POSR Factor	2 items	3 items
1. Friendly and Cheerful	.91	.93
2. Knowledgeable and Poised	.87	.87
3. Lively and Interesting	.77	.79
4. Firm Control	.91	.92
5. Non-Directive	.78	.74

* Contents of this table were obtained from a report by Veldman and Peck (1961)

As a result of these correlations, Veldman and Peck concluded that the use of two items were as good an estimate of the POSR factor scores as the three item factors. The two items were slightly reworded and became the Student Evaluation of Teaching or (SET). The POSR items and their reworded counterparts which make up the SET are as follows;

Factor I Friendly and Cheerful

SET-1 This teacher is always friendly toward students.
POSR-26 She is always friendly toward her students.

SET-6 This teacher is usually cheerful and optimistic.
POSR-29 She always seems cheerful and happy.

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Factor II Knowledgeable and Poised

SET-2 This teacher knows a lot about her subject.
POSR-17 She knows a great deal about her subject.

SET-7 This teacher is not confused by unexpected questions.
POSR-34 She does not get confused by unexpected questions.

Factor III Lively and Interesting

SET-3 This teacher is never dull or boring.
POSR-12 Her class is never dull or boring.

SET-8 This teacher makes learning more like fun than work.
POSR-31 She makes learning seem more like fun than work.

Factor IV Firm Control

SET-4 This teacher expects a lot from students.
POSR-3 She expects a lot from her students and usually gets it.

SET-9 This teacher doesn't let her students get away with anything.
POSR-32 She doesnt let her students get away with anything.

Factor V Non-Directive

SET-5 This teacher asks for student's opinions before making decisions.
POSR-8 Before she decides on a new project, she0often asks students what they think.

SET-10 This teacher often gives students a choice in assignments.
POSR-28 She likes to give the student a choice of how to do an assignment.

Two universities have implemented an evaluation program based on Sandefur's (1970) model and the SET has been part of these systematic and ongoing follow-up studies of teacher education graduates. These two programs have been implemented at Western Kentucky University and at Tennessee Technological University. Data in this study were obtained from

the Western Kentucky University follow-up evaluation program. The project at Western Kentucky University is known as the Teacher Preparation Evaluation Program (TPEP) and utilizes the SET as one of many data gathering instruments. TPEP participants utilized in this study were in their first, third or fifth year of actual teaching experience.

METHODOLOGY

PURPOSE

It was the purpose of this study to analyze SET data obtained from inservice teachers' students in grades four through twelve to determine if these data support the developmental constructs reported by Veldman and Peck (1970) for student teacher ratings on the SET. Since the SET was developed from data collected in grades seven through twelve, attention was given separately to data collected in grades four through six to determine if these grade levels were appropriately measured by the SET. The findings from this study has immediate application in the follow-up evaluation program at Western Kentucky University.

SAMPLE

The sample used in this study consisted of 419 students from 19 elementary classrooms (grades 4-6) and 612 students

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from 30 secondary classrooms (grades 7-12). All teachers evaluated were graduates from Western Kentucky University and were teaching in Kentucky. The teachers' experience ranged from one to five years. All teachers were part of an ongoing evaluation program (TPEP) in which they were voluntary participants. In the elementary sample 95 percent were female while the secondary sample contained 67 percent female participants.

DATA

The SET was administered during the latter part of the 1977 and 1978 school years to all students in each classroom by trained proctors. Appointments were scheduled with teachers for two visits to each teacher's classroom and the SET was administered during the second visit. Proctors consisted of the TPEP director and graduate assistants, each experienced in administering the SET. Students were given information about the purpose of the evaluation and directions on how to complete the instrument. They were instructed not to put their names on the evaluation forms. Proctors also assisted students when requested. Teachers were allowed to remain in the room during the evaluation if they desired, but were not part of the administration procedures.

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ANALYSIS

The purposes of the analysis were to determine if: 1.) the degree to which the factor structure of the inservice teachers agreed with the factors suggested by Veldman and Peck, and; 2.) the quality of these factors in measuring the five constructs suggested by the original authors. In replicating the developmental study of Veldman and Peck for inservice teachers, those responses from students in grades seven through twelve were subjected to a factor analysis technique available through the Statistical Package for Social Science (SPSS, 1975). A Varimax rotation option was utilized to determine if the paired item combinations, designed to approximate the POSR factors, were extracted from the TPEP sample. The same factor analysis procedure was utilized for the responses obtained from students in grades four though six.

To determine the quality of the measurements on each of the five factors reliability coefficients, coefficient alpha (SPSS, 1977) were computed for all five SET dimensions. In addition, strength of relationship for each of the two items comprising a factor was investigated through Pearson r coefficients, Cramer's V coefficients, Eta, and the contingency coefficient. Cell frequencies were tabulated to visually depict these relationships. The rationale for these analysis was that 1) the two items of the SET factors should form consistent factors when all the items were forced into five

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factors via factor analysis (Varimax Rotation) technique, and 2) the paired items should have reasonably high alpha coefficients and be reasonably correlated. The degree to which these expectations are met would suggest the quality of measurement of the SET for the two groups of responses studied.

RESULTS

Table 2 presents the Varimax Structure obtained by Veldman and Peck (1970) using the two item factors to represent the POSR factors. The item loadings are expectedly high. Table 3 contains the Varimax Structure for TPEP secondary classes on the same paired items. From these two tables it can be observed that the structures are similar. However, the TPEP analysis show considerably weaker factor loadings for the paired item factors. Factor four, (items 4 and 9) are particularly weak. Table 4 contains the Varimax Structure obtained for elementary classes. Factor one is the only factor that approximates the Veldman and Peck and secondary TPEP structures. The other items are considerably weaker than either of the two structures based on secondary student responses. The order of the factors were also different from the original analysis for each TPEP group.

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TABLE 2

POSR Varimax Structure Extracted by Veldman and Peck

POSR Factor	SET Item	Factor 1	2	3	4	5
1	1	.89	.18	.18	.02	.22
	6	.89	.12	.23	.08	.23
2	2	.19	.89	.10	.19	.11
	7	.11	.84	.28	.19	.18
3	3	.39	.33	.71	.26	.24
	8	.45	.28	.70	.12	.36
4	4	.21	.28	-.06	.86	.09
	9	-.16	.10	.34	.83	.04
5	5	.17	.09	.12	.10	.91
	10	.27	.20	.26	.00	.81

TABLE 3

Varimax Structure Extracted for SET Secondary Classes

POSR Factor	SET Item	Factor 1	2	3	4	5
1	1	.73	.23	.20	.07	.01
	6	.63	.19	.21	.22	-.11
2	2	.25	.11	.43	.02	.04
	7	.12	.06	.63	.17	.04
3	3	.38	.18	.17	.55	.01
	8	.45	.38	.09	.48	-.11
4	4	-.03	-.02	.03	.00	.53
	9	-.05	.09	.18	.23	.20
5	5	.21	.51	.13	.11	-.04
	10	.11	.53	.05	.10	.05

TABLE 4

Varimax Structure Extracted for SET Elementary Classes

POSR	SET	Factor				
Factor	Item	1	2	3	4	5
1	1	.54	.20	.09	-.10	.30
	6	.72	.12	.08	-.15	.15
2	2	.39	-.00	.16	.08	.00
	7	.18	.08	.68	-.02	.05
3	3	.39	.11	.29	.10	.27
	8	.45	.37	.10	-.13	-.02
4	4	-.07	-.06	.01	.62	.01
	9	.11	-.04	.19	.15	.21
5	5	.10	.67	.05	-.04	.05
	10	.11	.38	.01	-.06	.38

The second part of the analyses dealt with the quality of measurement provided by the SET item pairs. Reliability coefficients were computed to determine the internal consistency of measurement for each pair of items for each group. Table 5 contains these Alpha coefficients. Only three of the coefficients were above .60, indicating a poor internal consistency for the factors, even for the secondary sample (see table 5).

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TABLE 5

Reliability Coefficients for the Five SET Paired Items

POSR Factor	SET Item	Grade Level Elementary	Secondary
1	1	.65	.71
1	6		
2	2	.25	.44
2	7		
3	3	.38	.67
3	8		
4	4	.14	.21
4	9		
5	5	.43	.47
5	10		

To explain the poor internal consistency of the two item factors, correlation coefficients were computed to determine the degree of relationship between the paired items. Guilford (1965) stated, "The larger the item intercorrelations, the greater is the internal consistency." It follows that if items have limited variance, item correlations may have low correlation coefficients even though they were measuring the same construct.

Veldman (1970) reported high correlations between paired items for each of the SET dimensions. Similar results were not obtained from the TPEP analysis.

Pearson r, Cramer's V, and Contingency coefficients were computed for each pair of items to describe the relationship assuming both continuous and discrete data. None of the coefficients approached the magnitude reported in the original developmental study. Table 6 contains the correlations reported by Veldman and the coefficients computed from the TPEP data.

TABLE 6

Relationships of the Paired Items for Dimensions 1-5 of the SET

POSR	SET	V&P *	Secondary			Elementary		
Dim	Item	r	r	V	C	r	V	C
1	1 6	.86	.55	.37	.54	.49	.35	.52
2	2 7	.73	.30	.22	.36	.17	.15	.25
3	3 8	.85	.51	.37	.54	.24	.21	.34
4	4 9	.56	.12	.14	.24	.08	.15	.25
5	5 10	.71	.31	.22	.36	.27	.20	.33

* Results taken from a monograph by Veldman (1970)

r= Pearson Correlation Coefficient
V= Cramer's V
C= Contingency Coefficient

A further analysis of these data were made by preparing contingency tables to visually inspect the relationship between paired items. A four by four table was constructed to show the frequency of responses0for each of the SET dimensions. For dimension one (items 1 and 6) there appears to be a consistent pattern for both elementary and secondary data. (See Table 7). The majority of ratings (71 percent for elementary and 81 percent for secondary) fell in the upper quadrant of the matrix, which indicated that most students rated their teacher as a 3 or 4 on items 1 and 6. This restricted variance in items would contribute to the moderate correlation for these items.

Dimension two (items 2 and 7) also displayed a similar distribution with 64 percent of the elementary respondents and 78 percent of the secondary respondents rating teachers in the upper quadrant. It can also be observed that for item 2, 72.8 percent of the elementary students and 74.3 percent of the secondary students rated their teachers a "4" thus restricting the variance for item 2 considerably. Table 8 contains these cross tabulated distributions.

For the third dimension (items 3 and 8) of the SET, the student ratings were not as heavily distributed in the upper quadrant (50 percent for elementary and 48 percent for secondary). From Table 9 the distributions appeared to be more random across cells for both groups, however, the secondary students had more of a linear distribution (frequencies

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along the diagonal) than did the elementary students. This is of course also evident from the Pearson r coefficients of .24 for elementary and .51 for secondary.

Dimension four (items 4 and 9) showed more of a random cell frequency than the previous dimensions indicating simply a lack of relationship between the items. Table 10 contains these cross tabular frequency distributions.

The final dimension (items 5 and 10) also had a random distribution with tendency toward higher cell frequencies in the lower quadrant. As for dimension four, there appears to be little relationship for these two items (See Table 11).

TABLE 7

Distribution of Paired Item Responses for SET Dimension 1

Elementary Grade Level

ITEM1	COUNT	ITEM6 1	2	3	4	ROW TOTAL
4		11	14	60	137	222
						53.2
3		14	25	74	26	139
						33.3
2		12	9	9	3	33
						7.9
1		13	3	3	4	23
						5.5
COLUMN TOTAL		50	51	146	170	417
		12.0	12.2	35.0	40.8	100.0

Secondary Grade Level

ITEM1	COUNT	ITEM6 1	2	3	4	ROW TOTAL
4		3	16	110	234	363
						59.4
3		12	35	111	39	197
						32.2
2		7	18	8	3	36
						5.9
1		7	4	3	1	15
						2.5
COLUMN TOTAL		29	73	232	277	611
		4.7	11.9	38.0	45.3	100.0

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TABLE 8

Distribution of Paired Item Responses for SET Dimension 2

Elementary Grade Level

ITEM2 \ ITEM7	1	2	3	4	ROW TOTAL
4	38	55	88	121	302
					72.8
3	19	20	41	16	96
					23.1
2	3	1	7	1	12
					2.9
1	1	2	1	1	5
					1.2
COLUMN TOTAL	61	78	137	139	415
	14.7	18.8	33.0	33.5	100.0

Secondary Grade Level

ITEM2 \ ITEM7	1	2	3	4	ROW TOTAL
4	17	50	162	224	453
					74.3
3	8	29	64	33	134
					22.0
2	4	5	6	2	17
					2.8
1	4	0	2	0	6
					1.0
COLUMN TOTAL	33	84	234	259	610
	5.4	13.8	38.4	42.5	100.0

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TABLE 9

Distribution of Paired Item Responses for SET Dimension 3

Elementary Grade Level

ITEM3	COUNT	ITEM8 1	2	3	4	ROW TOTAL
4		15	16	41	79	151
						36.7
3		13	21	44	41	119
						28.9
2		12	12	26	16	66
						16.0
1		29	7	10	30	76
						18.4
COLUMN TOTAL		69	56	121	166	412
		16.7	13.6	29.4	40.3	100.0

Secondary Grade Level

ITEM3	COUNT	ITEM8 1	2	3	4	ROW TOTAL
4		5	13	44	74	136
						22.3
3		13	56	105	67	241
						39.5
2		38	64	38	12	152
						24.9
1		49	9	10	13	81
						13.3
COLUMN TOTAL		105	142	197	166	610
		17.2	23.3	32.3	27.2	100.0

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TABLE 10

Distribution of Paired Item Responses for SET Dimension 4

Elementary Grade Level

ITEM4	COUNT / ROW TOTAL	ITEM9 1	ITEM9 2	ITEM9 3	ITEM9 4	ROW TOTAL
4		47	22	34	80	183
						44.1
3		17	20	37	47	121
						29.2
2		9	14	16	12	51
						12.3
1		19	6	18	17	60
						14.5
COLUMN TOTAL		92	62	105	156	415
		22.2	14.9	25.3	37.6	100.0

Secondary Grade Level

ITEM4	COUNT / ROW TOTAL	ITEM9 1	ITEM9 2	ITEM9 3	ITEM9 4	ROW TOTAL
4		27	34	48	59	168
						27.6
3		28	67	115	47	257
						42.2
2		19	35	49	24	127
						20.9
1		17	13	14	13	57
						9.4
COLUMN TOTAL		91	149	226	143	609
		14.9	24.5	37.1	23.5	100.0

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TABLE 11

Distribution of Paired Item Responses for SET Dimension 5

Elementary Grade Level

ITEM5	COUNT	ITEM10 1	2	3	4	ROW TOTAL
4		68	27	25	37	157
						37.7
3		51	24	28	10	113
						27.2
2		46	12	2	6	66
						15.9
1		60	8	8	4	80
						19.2
COLUMN TOTAL		225	71	63	57	416
		54.1	17.1	15.1	13.7	100.0

Secondary Grade Level

ITEM5	COUNT	ITEM10 1	2	3	4	ROW TOTAL
4		38	27	30	20	115
						18.9
3		80	70	49	12	211
						34.7
2		86	48	18	6	158
						26.0
1		95	14	8	7	124
						20.4
COLUMN TOTAL		299	159	105	45	608
		49.2	26.2	17.3	7.4	100.0

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In summary, items for dimension one appear to be measuring a similar construct, but due to the heavy frequency loading in the upper four cells the relationship is low. Dimension two has similar cell loadings, in the upper quadrant, but also the extremely restricted variance for item 2 further reduces the correlation for this dimension. The third dimension has more of a random cell distribution for elementary, but a somewhat linear distribution for secondary. Dimensions four and five appear the most randomly distributed across cells.

DISCUSSION

Discussion and Conclusions

The development of a short, economical, easily administered, and easily scored instrument for student evaluation of teacher behavior is a worthy objective. However, to be usable the instrument must also produce reliable measures in which the user can have confidence. Whether used by individual teachers for0 self evaluation purposes or as part of a follow-up teacher education program, the quality of measurement must be considered. It was this concern for quality that led to the conduct of this study.

The factor structure reported by Veldman (1970) for secondary level student ratings was generally replicated for

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the secondary student ratings in this study. However, their structure was weak leaving doubt as to the internal consistency of the dimensions. Elementary student data did not produce a factor structure resembling the Veldman and Peck analysis. With the exception of item one, the items in the five SET dimensions did not appear to be measuring similar constructs for students in grades four through six.

In further analysis of the SET dimensions, the reliability coefficients were very low for all but dimension one for both elementary and secondary. These results further support the lack of internal consistency and provide more evidence for the poor measurement quality of this instrument.

When the paired items were correlated, much weaker correlation coefficients were obtained than reported by Veldman (1970). A further analysis through cross tabulation of the frequencies of response supported items in dimensions one and two as measuring similar constructs, but due to the restricted range items had low or moderate correlation coefficients. Ratings for items in dimensions three, four, and five appeared to be more randomly distributed suggesting that these items were measuring different constructs.

Veldman and Peck discussed the SET in terms of its use as a feed back instrument. They suggested it be used for giving a relative profile to teachers for use in gaining insight into student perceptions of their teaching

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performance. If used in that respect, and perhaps held within the realm of student teaching, its usage may be defensable. Based on the results of this study, it is not recommended that the instrument be used in summative evaluations such as teacher follow-up studies, particularly if the SET dimension scores are used as suggested in the original development.

Coats (1970) reported that 61.5 percent of the variance in student evaluations of their teachers fell into a category called "teacher charisma". That factor seemed to stem directly from the students' perceptions of the teacher rather than the teachers' actual classroom behavior. It is possible that the first two or three dimensions taken together on the SET are measuring teacher charisma. However, this statement is highly speculative and beyond the analysis presented in this study.

Regardless of whether the SET measures charisma or separate factors there remains the question of applicability of the SET to different populations and to varying evaluation settings. The instrument needs further study to determine its utility. For programs that have or intend to use the SET for student evaluations of teachers, it is recommended that individual items be used in place of the five dimensions suggested by Veldman. Further, it is recommended that use be limited to the original developmental grade levels of seven through twelve.

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